

***Ignicoccus hospitalis* – understanding its extraordinary radiation tolerance and an unsolved archaeal repair system**

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Ignicoccus hospitalis is an extremophilic Archaea that has demonstrated an extraordinary high tolerance to ionizing radiation. The cells remain viable after exposure to X-ray doses up to 12 kGy, metabolically active after up to 118 kGy and completely repair DNA damages within one hour. This is surprising since ionizing radiation is not present in its natural habitat - a submarine system of hydrothermal vents.

In this work, the origin and mechanisms of *I. hospitalis* radiation tolerance are being addressed studying the intracellular-specific protection (e.g. polyploidy, compatible solutes, histone-like proteins and Mn²⁺/Fe²⁺ ratio). Therefore, different growth parameters have been tested and DNA extraction protocols optimized to gain information about numbers of genome copies. Additionally, the existence of an unknown repair system (e.g. up-regulation, DNA lesions, DNA repair proteins) will be investigated.

This will help gain knowledge on the DNA repair mechanisms in Archaea, and to better understand the limits of life.